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To:	Rulemaking Comments
Cc:	Hardesty, Duane; Shea,Brian C; Jordan, Kelly A; 'Bobek, Leo'; Berglund,Matthew A
Subject:	UFTR Comments on NRC-2012-0167-0002/3
Attachments:	UFTRCommentsNRC-2012-0167.docx

Please find attached the UFTR comments on NRC-2012-0167-0002/3.

These same comments have also been submitted via the regulations.gov website under Document ID NRC-2012-0167-0001. The comment tracking number is 810d2ec5.

Please feel free to call or email with any questions, comments, or concerns.

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UFTR Comments on NRC-2012-0167

	STATEMENT	COMMENT
1	General Comment	Insufficient time has been allotted for this comment period. This 30-day comment period ending 8/13/2012 overlapped the 30-day comment period for NRC-2011-0087 which ended 7/31/2012. Both issues significantly affect the RTR/NPR community. Of the 31 operating RTRs, 18 are state university operated. Having overlapping 30-day periods during the Summer semester timeframe provides little opportunity for minimally staffed university RTRs to submit comments since some RTR university faculty may be on vacation during the Summer semester. Summer is also the traditional timeframe allotted for non-university personnel vacations as well. The comment period should be extended to 75-days or re-opened during the Fall semester timeframe to allow ample opportunity for stakeholder comments.
2	General Comment	In the current rev of 7.3 part 1, the word "safety" is used four times. This is consistent with typical RCS functions which are non-safety (this is actually stated later in the proposed draft text). In the proposed draft, there are 32 uses of the word "safety". Most in reference to safety-related functions. Detailed discussion of safety-related functions is better suited to the safety-related system sections. The word "should" is used more than 70 times with no clear bases in regulation. Except in those limited cases where there is a very clear qualifier for when the "should" applies, each use results in an implied requirement, created outside of the rule making process. Combining the term "should" with the vague standard of "reasonable assurance" will result in many unnecessary RAIs. This creates an unjustified burden on both the NRC and licensee. Recommend elimination of the word "should" in this document unless there is a clear qualifier and regulatory basis for when the word "should" applies. The qualifier and regulatory basis should accompany each use of the word "should" to ensure clarity for both licensee and NRC. Consider incorporating examples of what methods the "NRC finds acceptable", or similar phrasing, to reduce reliance on the word "should". In this proposed revision, part 1 of section 7.3 increases in size from less than 4 to almost 12 pages with no apparent change in regulatory basis, increase in suitable guidance, or reduction in burden. If this

		proposed revision is indicative of planned future NUREG-1537 changes, part 1 of NUREG-1537 will grow to be over 1500 pages. In contrast, NUREG-0800, the SRP for LWRs, section 7.7 for the Control System is only 10 pages in length and that includes the acceptance criteria as well. My overall recommendation is that Section 7.3 be completely re-written. The only safety-related function guidance that belongs in Section 7.3 is for the case of a combined digital RCS/RPS system. Serious consideration should be given to a significantly more streamlined format that first lists the applicable regulation followed by further explanation and legal basis for NRC interpretation of any vague terms in the regulation (i.e. terms like "reasonable assurance"). This further explanation would be most useful if it included clearly illustrated examples of methods the NRC finds acceptable for specific areas of the regulation(s). Regulation that is generic (not system specific) in nature should be stated early in the Chapter and redundant statements should be eliminated. Consideration should also be given to the fact that this guidance is intended to be implemented at NPRs. The lower risk associated with NPRs makes them well suited platforms for research and development of future I&C systems. This type of prototype testing shouldn't be prevented as the result of unnecessary "guidance" or requirements. Those NPR facilities who wish to upgrade their I&C systems in the future should not be forced into a scaled down power reactor system when a much simpler and less expensive alternative may exist that meets all the *actual* requirements.
3	General Comment	In many instances, the same text is repeated in this document and the accompanying part 2 document. In the interest of efficiency, and due to the lack of time allotted for comment, the reviewer chose not to repeat those comments. This is also an effort to limit the number of duplicate comments.
4	*7.3 Reactor Control System*	Consider changing the title to Reactivity Control System.
5	*The RCS performs several functions, such as maintaining the reactor in a shutdown state, reactor startup, changing power levels, maintaining operation at a set power level, and shutting down the*	Typically RCS functions are described in terms of reactivity control. For example, this statement could be reworded as follows: The RCS is typically used to provide positive control of reactivity changes under

	reactor.	normal operational conditions.
6	*In non-power reactor designs that allow pulsing such as the TRIGA design); the RCS can rapidly insert reactivity into the reactor core to produce a predetermined high-power pulse of short duration, or to achieve a rapid increase in reactor power in a "square wave."*	This statement serves no regulatory purpose as written. It is more appropriate for an initial systems training session than a NUREG.
7	*In the nuclear instrument system, nuclear instruments monitor the neutron flux' from the subcritical source multiplication range, through the critical range, and' through the intermediate flux range to full power.*	Naming the ranges of flux measurement using terms like subcritical, critical, source multiplication, and intermediate is unnecessary and inappropriate in this context. These terms are better suited to a reactor theory training session.
8	*Neutron flux instruments also should determine the startup rate and, in some designs, reactor period information.*	Startup rate and period are directly related and easily converted from one unit to the other. Both can be measured using a stopwatch. There may be no regulatory basis for inclusion of either measurement unless the licensee relies on a fast period or high SUR trip for safety analyses purposes. Please provide an objective regulatory basis for specifying the determination of SUR and/or period.
9	*Linear and log neutron flux channels should be used to monitor the core neutron flux while control rods are withdrawn or inserted to increase or decrease reactor -power. At least one linear neutron flux channel should be calibrated to reactor thermal power.*	Please provide an objective regulatory basis for specifying linear and log channels and the calibration of at least one linear channel.
10	*The process instruments are designed to measure and display such parameters as coolant flow, temperature, or level; fuel temperature; or air flow parameters within or from the reactor room. In some designs, this information may also be sent to the RPS.*	These particular process instruments are more likely inputs to the RPS rather than the RCS and therefore this paragraph would be more appropriate in the RPS section. Typically reactor room air flow parameters would have no connection to the Reactor Control System and therefore this discussion is better suited to Chapter 9 and/or other sections of Chapter 7.
11	*The typical non-power reactor has an automatic control (servo) system that controls the reactor power about a point set by the operator. Most servo control systems compare the output of a linear neutron flux channel against an adjustable voltage representing the desired power level; and automatically change the position of a regulating rod in the core to change the neutron flux density to reduce the difference between the two voltages until the actual reactor power level is very nearly equal to the desired power level. This process can be performed by analog control equipment or by software in a digital computer system.*	This statement serves no regulatory purpose as written. It is more appropriate for an initial systems training session than a NUREG.
12	*Reactors with pulsing capabilities have a transient rod that, on command, is rapidly ejected out of the core to a pre-programmed distance. This action rapidly inserts a known amount of excess*	This statement serves no regulatory purpose as written. It is more appropriate for an initial systems training session than a NUREG.

	reactivity into the core that pulses the core power to very high levels for very short intervals. The system can also be used to form a square wave power increase to a predetermined steady-state power level.	
13	*The RCS for non-power reactors should have a set of equipment protection interlocks and inhibits that prohibit or restrict operation of the reactor unless certain conditions are met.*	Please provide an objective regulatory basis for specifying the use of interlocks and inhibits for all NPR RCSs.
14	*All experiments should be carefully considered for interaction with the I&C system when the safety analysis for the experiment is performed. The analysis should consider any interaction with the RCS or RPS. Where such interactions are warranted, they should meet the standards used for the design of the systems to which the experimental facilities will be connected.*	In this context, a post-design, post-operational, discussion of experiment safety analyses and 50.59 criteria are outside the scope of this section and this NUREG.
15	*Title 10, Section 50.34(a) of the Code of Federal Regulations describes the information to be supplied in a PSAR while 50.34(b) describes the information to be supplied in an FSAR. More specifically, 10CFR50.34(a)(3)(i) requires applicants to provide the principal design criteria for the facility and 10CFR50.34(a)(3)(ii) requires applicants to describe the design bases and the relation of the design bases to the principal design criteria.*	This information is generic, redundant, and better suited to an earlier section(s) of this NUREG such as Section 7.2.
16	*10CFR50.34(a)(3)(i) requires applicants to provide the principal design criteria for the facility*	This information is generic, redundant, and better suited to an earlier section(s) of this NUREG such as Section 7.2.
17	*The principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.*	This statement is not in 10CFR50.34(a)(3)(i). Please provide the source of this statement and the regulatory basis for its inclusion in the context of a NPR RCS regulatory standard.
18	*Consideration of the need to design against single failures (e.g., I&C systems should be designed so that a single failure will not prevent the safe shutdown of the reactor)*	Safe Shutdown is defined in 10CFR50.2. The ability to bring the plant to Hot Standby or Hot Shutdown following a station blackout is a power reactor concept that may not be appropriate in this NPR context.
19	*1. Consideration of the need to design against single failures (e.g., I&C systems should be designed so that a single failure will not prevent the safe shutdown of the reactor),* *2. Consideration of redundancy and diversity requirements,* *3. Consideration of the type, size, and orientation of possible breaks in components of the reactor coolant boundary in determining design requirements to suitably protect against postulated loss-of-coolant accidents, and*	These design criteria statements are not in 10CFR50.34(a)(3)(i). Please provide the source of these statements and the regulatory basis for their inclusion. Additionally, these design criteria statements are generic in nature. If there is determined to be a sound regulatory basis applicable to NPRs, their inclusion would be better suited to an earlier section of Chapter 7.

	4. Consideration of the possibility of systematic, nonrandom, concurrent failures of redundant elements in the design of protection systems and reactivity control systems.	
20	*The basis for evaluating the reliability and performance of the I&C systems should be included. All systems and components of the I&C systems should be designed, constructed, and tested to quality standards commensurate with the safety importance of the functions to be performed. Where generally recognized codes and standards are used, they should be named and evaluated for applicability, adequacy, and sufficiency.*	This information is generic, redundant, and better suited to an earlier section(s) of this NUREG such as Section 7.2.
21	*10CFR50.34(a)(3)(ii) requires applicants to describe the design bases and the relation of the design bases to the principal design criteria.*	This information is generic and better suited to an earlier section(s) of this NUREG such as Section 7.2
22	*Design bases means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design.*	This information is generic and better suited to an earlier section(s) of this NUREG such as Section 7.2.
23	*These values may be (1) restraints derived from generally accepted "state of the art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals.*	These design bases statements are not in 10CFR50.34(a)(3)(ii). Please provide the source of these statements and the regulatory basis for their inclusion. Additionally, these design bases statements are generic in nature. If there is determined to be a sound regulatory basis applicable to NPRs, their inclusion would be better suited to an earlier section of Chapter 7.
24	*The design bases should identify modes of operation, environmental parameters, safety functions, permissive conditions, variables to be monitored and their ranges, conditions for manual control, and any other special design bases that may be imposed on the system design (e.g., interlocks).*	This information is redundant and better suited to an earlier section(s) of this NUREG such as Section 7.2.
25	*For example, the modes of operation at a facility may require a period meter; this should be identified in the design basis because some pulse reactors may not need a period meter.*	This statement is confusing. Consider rewording as follows: "Certain evolutions may benefit from period or startup rate indication". Use of the word "meter" should be avoided and replaced with indication or indicator if needed.
26	*For the control system, the design bases should demonstrate that the RCS is not required for safety.*	See general comment on page 1 regarding inappropriate overuse of the word "safety" when providing guidance on the RCS.
27	*Title 10, Section 50.34(a) of the Code of Federal Regulations describes the information to be supplied in a PSAR while 50.34(b) describes the information to be supplied in an FSAR. The range of the sensors should cover the range of the accidents.*	This information is generic and redundant and better suited to an earlier section(s) of this NUREG such as Section 7.2. Please provide the regulatory basis and source for the statement regarding sensor ranges.

28	*All applications should provide sufficient detail to allow an evaluation on the basis of their technical content and completeness*	This sentence provides no clarity or guidance. The level of detail should be commensurate with the safety significance.
29	*The system description of the RCS should include equipment and major components as well as block, logic, and schematic diagrams, including hardware and software descriptions and software flow diagrams for digital computer-based systems. The descriptions should also address how the system operational and support requirements will be met and how the operator interface requirements will be met.*	The level of detail provided in the RCS system description should be commensurate with the safety significance of the system. As stated several paragraphs above, in most cases, the RCS will be a non-safety system. Please provide the regulatory basis for the level of detail requested.
30	*The applicant should include a description of the design criteria for the RCS as outlined in Section 7.2.3 (Part 1), including any additional system descriptive material specific to subsystem design and implementation not covered in Section 7.2.*	The first half of this statement is generic and redundant. The last portion of this statement provides no clarity or guidance and seems intended to provide a catch-all clause for any other information that the staff may desire in the future.
31	*An analysis of ~~Analyze~~ the operation and performance of the system as specified in Section 7.2.4 including analyses and results of any features or aspects specific to the facility design and implementation not specified in Section 7.2.*	The last portion of this statement provides no clarity or guidance and seems intended to provide a catch-all clause for any other information that the staff may desire.
32	*10CFR50.55a(a)(1) requires that structures, systems, and components be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed*	Please provide the an objective regulatory basis applicable to NPRs for 50.55a(a)(1). Additionally, this regulation is system generic in nature and therefore discussion of this regulation is better suited (assuming there is determined to be a sound regulatory basis applicable to NPRs) to an earlier section of the NUREG.
33	*The design of the control system should be of sufficient quality to limit the potential for inadvertent actuation and challenges to safety systems. While the design of a control system that minimizes inadvertent actuations and challenges to a safety system is good practice, there is no specific requirement for such design practice in reactor applications for which no transients occur. That is, inadvertent actuation may not be a concern for research reactors below 2 MW and TRIGAs.*	The combination of these three sentences, in this sequence, has a net negative impact in terms of clarity and guidance. Please provide an objective regulatory basis for these statements.
34	General Comment	At this point in the review (part 1 of Section 7.3 – top of page 4 of 12), the reviewer ran out of time and had to submit these comments to meet the comment period deadline. More time is requested. See General Comment #1.